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SP341-G Corn Earworm on Sweet Corn

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Insects

Corn Earworm on Sweet Corn

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The corn earworm, *Helicoverpa zea* (Boddie), is the most serious insect pest of sweet corn in Tennessee. This pest feeds directly on the market product.

Damage

Early in the season, corn earworm larvae feed on the foliage of seedlings in the whorls. As the blades unfurl, ragged holes are seen in the leaves. Light brown excrement becomes lodged on the leaf blades and in the whorl. This type of damage is known as "shatterworm" injury.

Corn earworms prefer the fruiting stages (ears) of corn. Therefore, as the plant develops fruit, larvae move to those plant parts. Damage results from larvae feeding on the kernels in the ear tip area (Figure 1). Round emergence holes (approximately $^{3}/_{16}$ inch in diameter) in the shuck are often mistaken for entrance holes.

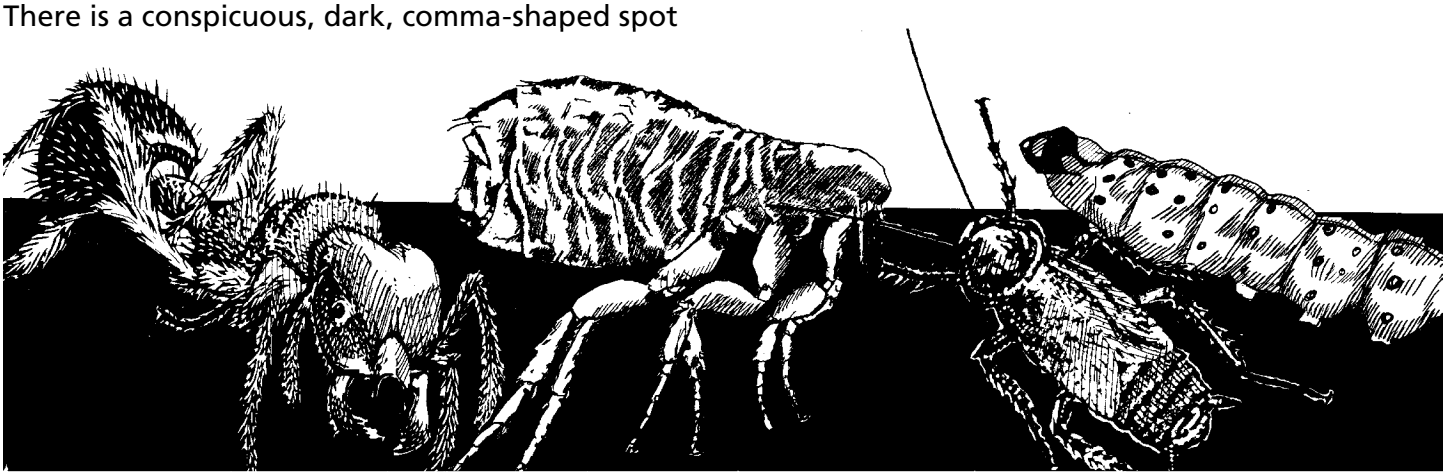
Description and Life Cycle

Corn earworms overwinter as diapausing pupae in the soil, usually at depths of 2 to 4 inches (Figure 2). Adult moths begin to emerge in early May. Wings on adult female moths have a span of about 1½ inches and are yellowish brown with darker lines and spots near the tip of the wings (Figure 3). There is a conspicuous, dark, comma-shaped spot on the front wing. The moths' eyes are greenish.

Moths are most active at night. After mating, female moths seek the leaves of seedling corn for egg laying early in the season. However, once the corn begins to silk, most of the eggs are laid singly on the silks.

Each female may lay from 450 to 3000 eggs. Eggs are $^{1}/_{32}$-inch in diameter. When first laid, eggs are pale white. Prior to hatching, a pale reddish band forms; then the egg darkens. Eggs hatch in two to five days and newly hatched larvae crawl down into the tip of the developing ear to begin feeding. Larvae develop through five or six instars (the larval stages between successive molts) while feeding for two to three weeks.

Figure 1. Larva feeding on kernels



After hatching, larvae are 1/16-inch long, are yellowish white and have dark head capsules. Second instar larvae are yellowish green with brown or orange stripes running the length of the body and have reddish brown head capsules. Later instars may reach a length of up to 1 3/4 inches and are greenish yellow, reddish or brown with pale longitudinal stripes, raised black spots and brown to orange heads (Figure 1).

Figure 2. Pupae

Figure 3. Adult moth

Since corn earworms are cannibalistic, usually only one or two larvae develop in the ear. The kernels near the ear tip are generally damaged. After completing their development, the larvae bore out of the shucks, drop to the ground and burrow into the soil to pupate. Two to three weeks pass before a new generation of moths emerges. At least three generations occur each year in Tennessee.

Control in Commercial Plantings

Yield losses due to corn earworms are greater on late-planted corn. Corn that silks and develops after early July may suffer considerable damage from earworms. During this period, it is important to protect the ears by applying insecticides every other day during the time from silking until time of harvest. Insecticides applied after the larva enters the ear are not effective.

The best spray equipment for commercial acreage is a high-clearance sprayer with four hollow-cone nozzles per row covering the ear zone (Figure 4). For optimum control, growers should apply 25 to 50 gallons per acre of finished formulation at 100 to 200 psi pressure. Aerial applications are effective, but when severe insect pressures occurs, spraying intervals may need to be shortened. Airblast sprayers are also effective as long as no more than a three-row swath is treated with each pass. Remember to maintain constant agitation when using wettable powders.

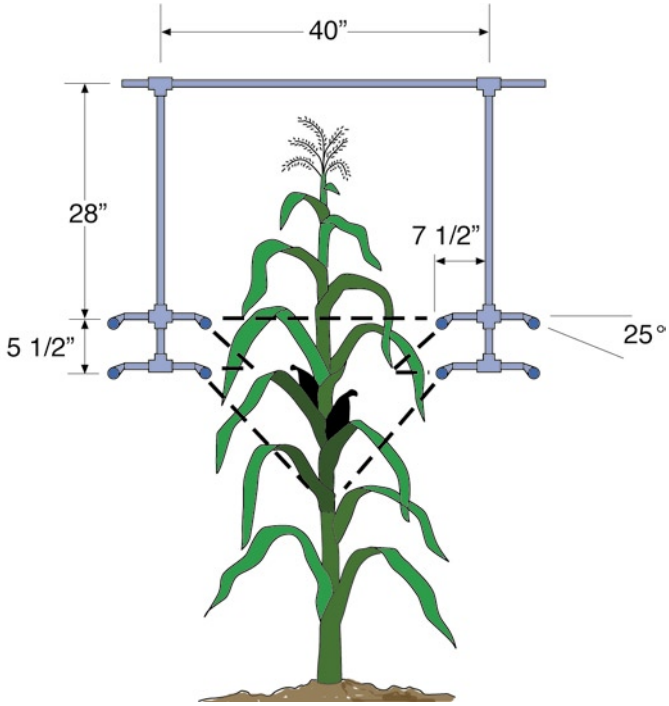


Figure 4. Suggested boom and nozzle arrangement

Control in Home Gardens

Sweet corn silking after early July is most susceptible to earworm injury. It is important to protect the ears from early-silking until the silks turn brown. Apply spray formulations with a 1-gallon or larger compressed air sprayer every two-to-three days for good results. Applications should be made during favorable weather (i.e., 70-80 degrees F temperature, wind less than 5 mph and no rain forecast for 24 hours). The nozzle should be held a few inches from the silks and the spray directed into them. One gallon should treat 150- to 200-row feet of sweet corn. When using wettable powders, be sure to repeatedly shake the sprayer to keep the insecticide in suspension.

Resistant Varieties

If possible, choose tolerant varieties with long silk channels, tight husks and fast growth. When larvae feed on corn with these characteristics, they tend to feed more in the silk and have difficulty reaching the kernels. In addition, silk moisture is maintained at a high level for a longer period of time. Larvae move rapidly down the husk to the ear tips if silks dry quickly inside the husks. In addition, tight husk varieties tend to elicit more cannibalistic behavior between larvae. While certain corn hybrids are unfavorable for earworm development, this low level of resistance is no substitute for an insecticide spray program.

References

Flood, B., R. Foster and B. Hutchison. 1995. Sweet Corn. In Vegetable Insect Management: with Emphasis on the Midwest, [eds.] R. Foster and B. Flood, Meister Publishing Co., Willoughby, Ohio.

Welty, C. 1991. Sweet Corn I.P.M. in Ohio. Vegetable Pest Management Circular #VC-2. Ohio Cooperative Extension Service.

Insecticides for Commercial Corn Earworm Control in Sweet Corn

Pesticide and Formulation	Amount in 25-50 Gallons Water/Acre	Harvest Restrictions	Remarks
esfenvalerate (Asana XL) 0.66 EC	5.8-9.6 fl. oz.	1 day	Plant as early as possible. Late-planted corn may be damaged severely. If silking occurs after July 1, apply insecticides every other day even though no damage is noted.
methomyl (Lannate) 90 SP 2.4 LV	1/2 lb. 1 1/2 pt.	0 day 0 day	Certain hybrid varieties are susceptible to methomyl injury. Treat a small area to determine crop safety before full scale spraying.
permethrin (Pounce) 25 WP (Pounce) 3.2 EC (Ambush) 2 EC (Ambush) 25 W	6.4-12.8 oz. 4-8 fl. oz. 6.4-12.8 fl. oz. 6.4-12.8 oz.	1 day 1 day 1 day 1 day	
bifenthrin (Capture) 2EC	2.1-6.4 fl. oz	1 day	
cyfluthrin (Baythroid 2) 2EC	1.6-2.8 fl. oz.	0 day	Up to 10 applications can be made per crop.
Spinosad (SpinTor) 2SC	3-6 fl. oz.	1 day	
lambda-cyhalothrin (Warrior) 1 CS	2.56-3.84 fl. oz.	1 day	
zetacypermethrin (Mustang Max) 0.8EC	2.8-4 fl. oz.	3 days	
cyfluthrin (Baythroid 2) 2EC	1.6-2.8 fl. oz.	0 day	
spinosad (SpinTor) 2SC	3-6 fl. oz.	1 day	
thiodicarb (Larvin) 3.2F	20-30 fl. oz.	0 day	
bifenthrin (Capture) 2EC	2.1-6.4 fl. oz.	1 day	

Insecticides for Home Garden Earworm Control in Sweet Corn

Pesticide and Formulation	Amount to Use in 1 Gallon Water	Harvest Restrictions	Remarks
carbaryl (Sevin) 50 WP	Use label rate	2	Sprays are needed at two-to-three day intervals if silking occurs after July 1. Direct spray into silks of ears as necessary up to a total of eight times.

Precautionary Statement

To protect people and the environment, pesticides should be used safely. This is everyone's responsibility, especially the user. Read and follow label directions carefully before you buy, mix, apply, store or dispose of a pesticide. According to laws regulating pesticides, they must be used only as directed by the label. Persons who do not obey the law will be subject to penalties.

Disclaimer Statement

Pesticides recommended in this publication were registered for the prescribed uses when printed. Pesticides registrations are continuously reviewed. Should registration of a recommended pesticide be canceled, it would no longer be recommended by the University of Tennessee.

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